

average, which is certainly one of the largest temperature gradients over the free ocean surface anywhere. The gradient between Stykkisholm and the coast of Norway is $1.3/35=0.04$. The mean temperatures for Angmagssalik, reduced to the fundamental period 1851-1900, are: February, -10.8° ; July, $+5.4^{\circ}$; annual, -2.6° . For Stykkisholm we have, for the same months, -2.7° , $+9.7^{\circ}$, $+2.8^{\circ}$, respectively. Northwest foehn winds occur at Angmagssalik from the interior of Greenland, and two interesting cases are described by Professor Hann.

In a letter to the Editor, Professor Hann suggests that similar studies as to the relation between the American coast and the island of Bermuda are very desirable.—C. A.

A HOMEMADE GLOBE.

For some years past the officials of the Central Office have been familiar with the use of the plain india rubber balls 3, 4, or 5 inches in diameter as a basis for representing the earth, its meteorological features, the solution of spherical triangles, and many problems that daily present themselves for study. Especially has Professor Bigelow frequently advocated the advantages derived from using such small spheres on which lines can be drawn and erased. We find the following note, by A. Morley Davies, on the same subject in the *Geographical Teacher*, published for the Geographical Association at London, vol. 2, p. 173.

Listening at the Conference to Mr. Smith's paper on the use of globes, it has occurred to me that a simple plan I have followed might be of interest to other teachers. I obtained some plain india rubber balls, $3\frac{1}{2}$ inches in diameter, of a terra-cotta color, for a few pence. I then thrust a long hat pin carefully through each, as the axis of my globe. Some I left at this stage for general use; others I marked with a few circles (such as equator, ecliptic, etc.) in paint; the advantage of the terra-cotta color is that white and black markings show equally well on it, so that different circles can be clearly distinguished. To illustrate either the plane of the ecliptic or the division of the earth into sunlit and dark halves, I use a piece of stiff cardboard with a $3\frac{1}{2}$ -inch circular hole cut out of it, into which the globe easily fits. The classes for which I use these balls are small ones; possibly in the case of large classes each pupil might make his own globe in this way. If anyone can suggest any substitute for hat pins, equally long and sharp but more rigid, it would be an improvement.

C. A.

DOES THE AURORA EVER ENVELOPE THE WHOLE EARTH?

No aurora is on record as having enveloped the whole earth simultaneously. The most extensive auroras, such as August 28-29, 1859, were visible in the course of that night over the greater part of Europe, West Africa, North America, and the Atlantic; or September 1-2, 1859, visible in the same way in North America and west to the Sandwich Islands, but not visible in Europe, where it was daylight, but magnetic disturbances were recorded there. These auroras of 1859 also occurred simultaneously in the southern and northern temperate zones, being observed in Australia and Chile. The most extensive aurora I know of was February 4, 1872, visible from Siberia and northern Greenland to India, Egypt, and Florida; also in Australia, Mauritius, and Natal. It seems plausible that if we had complete auroral records from all over the world, these great auroras might have been traceable farther east and west, north and south, but of course they could not have been in the daylight. If an aurora is seen on three successive nights at any one place, it is usually spoken of as three different auroras. It would only be allowable to call this one continuous aurora over the whole circle of latitude when we can prove that it was continuously visible during the night time at stations in different longitudes entirely around the globe. I believe this has never been done, but we came very near it in this last aurora of October 30-November 1, 1903, for which we have records from eastern Europe, the Atlantic, North America, and a large part of the North Pacific, while Asia is still to be heard from.

As regards "an aurora enveloping the whole earth," that would necessitate observing auroras in the tropical regions, so as to connect the north temperate with the south temperate auroras. Certainly this has never occurred, and it is not even plausible as an actual occurrence during the last two centuries, although plausible as a hypothesis applicable to some other condition of the atmosphere and the earth. Aurora encircling the earth between latitudes 40° and 70° north or south is plausible, but not yet proven to have occurred by actual observation.

Among the general works on auroras are: *Das Polarlicht*, Hermann Fritz, Leipzig, 1881. *Aurora Borealis*, Alfred Angot, International Scientific Series, vol. 81, London, 1896. *Auroræ, Their Characters and Spectra*, J. Rand Capron, London, 1879.

The general catalogues of auroras give the stations from which records have been received, and therefore the geographic extent. These are: *Verzeichniss beobachteter Polarlichter*, Fritz, Wien, 1873. On the periodicity of the Aurora Borealis, Joseph Lovering, *Memoirs of the American Academy of Arts and Sciences*, vol. 10, Cambridge, 1868.

In *Nature*, 1878, vol. 17, p. 373, there is a later note by Fritz discussing the question as to the simultaneity of auroras in America and Europe. Of 2878 days on which auroras were observed in America, there are 1065 on which they were also seen in Europe.

Especially during the years 1869-1872, out of 715 aurora days in America, there were 379 simultaneously in Europe. The author argues that the aurora is not a cosmical but a local phenomenon. The last extensive catalogue of auroras is that of Tromholt, published by the Academy of Sciences at Christiania. It contains several studies on auroral frequency and geographical extent by the editor, J. F. Schroeder, according to which the maximum frequency occurs in the northern regions of Norway in January, but in the southern regions in September and March, again confirming the idea that it is a local rather than a cosmical phenomenon.—C. A.

FAKE FORECASTS.

In ordinary mercantile business it is quite a common experience for the manufacturer of a good article that is rapidly growing in popular favor to find counterfeits or infringements on his patent springing up like mushrooms, and sometimes offering very serious and illegitimate rivalry. The Weather Bureau has gone through a very similar experience. In 1870 there were, we believe, no long-range forecasters known to the country, except the ordinary farmers' almanacs, and we doubt whether any but the most credulous placed any faith in them. I have often told of the confession of one of these almanac weather makers, who with a twinkle in his eye said that after the proper astronomical part of the almanac was completed, and when he was in the spirit for writing up the weather, he would sit down and make it up for a year ahead, or so long as he felt in the mood. He fully understood that some people can be gulled sometimes, but we all know that we can not fool *all* the people *all* the time. So far as we recall the names of those who have distinguished themselves for making popular weather predictions based on principles that are contrary to all our knowledge of meteorology, the list runs somewhat as follows: Venner, 1875-1890; Hicks, 1890 to date; Dunne, 1892 to date; Foster, 1885 to date; Elmer, 1903 to date; Snively, 1902-1904.

While these have been active in the United States, the rest of the world has also had its varied experiences. In England, Mr. Hugh Clements and his great expounder, Hon. William Digby, have vexed the printer with an imposing volume and the public with daily predictions in the local newspapers. These authors speak as confidently about the moon as Rev. Mr. Hicks does about Vulcan, Jupiter, and the other planets, real and imaginary. Italy and Austria have gone through a

sad experience with vortex-ring cannons for driving away hail. Russia has enjoyed the gratuitous services of Demtschinsky and his predictions based upon the moon.

In general, it would seem that weather prediction and long-range forecasts are so greatly desired that everyone is willing to give a man a fair show. The wonder is that the indefinite utterances of these oracles can be accepted as forecasts, or that their flat failure when they do become definite should not have consigned them to oblivion. Recall, for instance, the sad work of Falb, who in 1895 predicted terrible earthquakes and storms, possibly indicating the approaching end of the world, thereby frightening the whole of Spanish America, so that no work could be done for weeks and the whole community was thrown into a hopeless state of panic. Recall the prediction made about 1880 of an awful storm that would scourge the Gulf and South Atlantic States. Many of the intelligent inhabitants and nine-tenths of the less intelligent were frightened by the prediction, and allowed it to entirely alter their ordinary lives and business.

Who was it that in 1901 started a newspaper paragraph, purporting to come from some responsible person, predicting a hurricane for the coast of New Jersey on a certain date? So great was the anxiety that it was necessary for the Secretary of Agriculture to issue a counteracting telegram showing that the original was certainly a fake. A community even of the most intelligent, cool-headed people is likely to be carried off its feet by enthusiasm for some hero or by a mania for some financial scheme, or to be stampeded by fright. Emotions are contagious, and it is necessary for a community to protect itself against injurious popular movements, just as it would protect itself against injurious contagious diseases. Freedom of individual action is the ideal on which we have built up our republic; but when that freedom of action threatens the existence of the republic it must be restrained, moderately, if you will, and wisely, but still sufficiently to protect the public from danger. We would not for a moment countenance the publication of numerous nautical almanacs differing considerably in the prediction of the exact positions of the sun, moon, and stars, because we know that only one of these can be right, and that the others would certainly lead to errors in navigation that would endanger the lives of thousands of persons. The community does not allow either druggists or physicians to operate without first giving satisfactory evidence that they are competent to handle the drugs that they deal in. Every State has its laws relative to the licensing of steam engineers, since a steam engine in incompetent hands would be a menace to the lives of many.

Wherever the life and property of the citizens are at stake, the Government of the people, by the people, and for the people must necessarily look after their interests, and the time must soon come when a general law shall forbid the publication of weather predictions and storm warnings, especially those of a sensational character, by any others than properly licensed persons.

LIGHTNING STROKES IN THE OPEN FIELD.

It is commonly supposed that lightning strikes only elevated objects. In fact, on page 478 of the MONTHLY WEATHER REVIEW for October, 1902, Prof. John Trowbridge of Cambridge, Mass., shows how difficult, if not impossible, it is for lightning to strike down upon a smooth plane surface of water. Of course, the waves of the ocean and the irregularities on what is called a plane surface of land may occasionally be struck by lightning, and two cases of this kind have lately come to our notice.

In July, 1899, Mr. Morton Henry, on a farm near New Bethlehem, Pa., was in an open field, without trees near by, having only the horses, the plow, and a boy at hand. He and the boy sheltered themselves under the shoulders of the horses during

a light shower from an insignificant looking cloud. The horses were killed instantly and the men rendered unconscious.

On July 10, 1903, Mr. Sylvanus Summers, and his son Clinton Summers, were loading hay on their farm seven miles northeast of Canton, Ohio. The sky was somewhat threatening and light thunder was heard in the distance. There was no local rain, the storm was apparently far away, the sun was shining through rifts in the clouds, the hay wagon was passing between two small piles of hay, when the lightning struck it, killing the horses and Mr. Clinton Summers and prostrating the others. The hay did not catch fire, and there were only slight burns on the horses, but Mr. Summers's clothing was ignited in several places. No thunder of any consequence was heard after that belonging to this particular stroke, and no rain fell at this locality, although it rained shortly afterwards about a mile farther north.

These are cases against which it is impracticable to provide, since no one cares to wear a wire cage, such as electricians recommend as a perfect protection for houses and powder magazines. We must accept them as corresponding to the legal term "an act of God," or an "inevitable necessity occurring by reason of the operations of nature unmingled with human agency or human neglect."

THE CLIMATE OF MANILA.

The following extract from an article by Mr. William E. Curtis, formerly Chief of the Bureau of Central American Republics, and now residing in Manila, is taken from the Washington Evening Star of June 4, 1904. It graphically expresses the convictions of the Editor, based on his own short experience in the Tropics, and is in harmony with the writings of the best authors on the subject. The meteorological elements of climatology, especially heat and moisture, constitute a source of discomfort, but only in rare cases one of danger or disease. The majority of individuals are so constituted that by a proper attention to diet they may successfully become acclimated. It does not seem proper to attribute to the climate of any place the diseases that are due to neglect, carelessness, living germs, and other nonmeteorological causes.

Mr. Curtis's article points out the numerous local sources of disease, foul water, bad sewerage, poor quarantine, ignorance and carelessness of newcomers; but all these are foreign to the climate proper, about which he makes the following remarks:

The climate of Manila is no worse than that of Florida or New Orleans, Galveston, or any other of the Gulf ports of the United States. Its bad reputation is chiefly due to stories by those who did not know how to take care of themselves, and, being exposed to hardships, fatigue, and bad weather, being careless in their habits and ignorant of the dangers of the tropical sun and impure water, suffered from sickness, which they attributed to the climate instead of their own neglect.

It may be asserted truthfully that no tropical islands in the world enjoy a better climate than the Philippines, and if they were situated within a week or ten days' voyage of New York they would soon become a popular winter resort for pleasure seekers and a sanatorium for invalids. From the middle of November until the middle of March the atmosphere is delightful, and to those who like a semitropical climate like that of Florida it is unexcelled.

In the middle of the day the sun is hot, and those who are unaccustomed to it must wear pith helmets, carry umbrellas, and take the shady side of the street. Within doors it is always comfortable. A breeze springs up about 11 o'clock in the morning and blows gently all day and into the night. After 4 o'clock in the afternoon the air begins to grow cool, and from that hour until 9 the next morning through the winter months the thermometer will stand between 75 and 80 degrees day after day, with a breeze usually so cool that ladies need to wear a light wrap. During the night you will wake up and pull a blanket over you.

During the summer months, from the middle of March to the 1st of October, the atmosphere is humid and very depressing. Sometimes the air will be so heavy with moisture that it is difficult to breathe, and the pores of the body will flow with perspiration at the slightest exertion. This weather, however, is no more severe and the suffering no greater than that experienced in the towns along the Mississippi and Ohio rivers, in Florida, Texas, and the other Gulf States. Indeed, the temperature in Manila during the summer month after month will average lower than